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Nonlinear kicker injection development for on-axis injection using PCB tracks and solid conductors

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There are numerous injection schemes into storage rings, and implementations, exist for 4th generation light sources. In 2023 a Ti coated chamber was installed in the storage ring to enable such an injection scheme using the 8-wire design modeled after MAX/Bessy-II/Soleil. *The injection requirements and basic design of the nonlinear kicker is described in Ref**. Two approaches to the magnet design is being considered, one with the solid conductor embedded in a framework and another using tracks on a PCB. Both designs need to be tested to establish the pulser requirements specific to the magnet. To this end two low cost pulser circuits consisting of two Blumlein lines switches with surface mount silicon carbide (SiC) MOSFETs were produced. The pulsers were mounted directly on the kicker assembly to minimise stray inductance thereby keeping the voltage requirements down.

Measurements confirm the Ti coating results in a < 5% attenuation of the field and skew of the pulse. Measurements of the injected beam's position was collected to quantify the transverse stability and used to refine tracking studies to feed into the final geometry of the nonlinear kicker magnet.

Footnotes

[] R. Auchetti and Y. E. Tan, in Proc. IPAC'19, pp. 2300-2303. doi:10.18429/JACoW-IPAC2019-WEPMP001

[*] J. Da Silva Castro, et al, in Proc. MEDSI'18, pp. 48-49. doi:10.18429/JACoW-MEDSI2018-TUPH12

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